UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,397	03/29/2001	Brendan J. Kitts	VIGN1110	3292

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EXAMINER
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ART UNIT	PAPER NUMBER
3623	

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 December 2005.*

2a)☐ This action is **FINAL.** 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-15 and 17-22* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-15 and 17-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/23/05.*

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

1.   This non-final office action is in response to Applicant's Request for Continued

Examination filed December 23, 2005. Applicant's amendment amended claims 1-7

and 9-15, canceled claims 8 and 16 and added new claims 17-22. Currently Claims 1-

7, 9-15 and 17-22 are pending.

Response to Amendment

2.   The objection to the title is withdrawn in response to Applicant's amending the

title to "Predicting Customer Behavior Utilizing Polynomial Regression Analysis" as

suggested by the examiner.

Response to Arguments

3.   Applicant's arguments with respect to Claims 1-7, 9-15 and 17-22 have been

considered but are moot in view of the new ground(s) of rejection.

It is noted that the applicant did not challenge the Official Notice(s) cited in the

First Office Action therefore those statements as presented are herein after prior art.

Specifically it has been established that it was old and well known in the art at the time

of the invention to use splines for statistical analysis, predictive modeling, function

approximation or model training.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5.   Claims 1-7, 9-15 and 17-22 are rejected under 35 U.S.C. 102(b) based upon a

public use or sale of the invention.

        The public use or sale of the invention, a system and method for predicting a

behavior of a first customer of a vendor at a future date, sold by the Applicant under one

or more of the following product/service names: CirrusNet, Datasage, Customer

Analyst and/or netCustomer, is evidenced by at least the following:

        I. Datasage.com Web Pages (December 1998), herein after reference A;

        II. Sweat, Rick et al., Instant Marketing (August 1999), herein after reference B;

        III. Carton, Sean, Mining the Data Mountain (October 1999), herein after

reference C;

        IV. Kitts, Brendan, An Evaluation of Customer Retention and Revenue

Forecasting in the Retail Sector (October 1999), herein after reference C1;

        V. Datasage, RMS Revenue and Retention Forecasting Final Phase Model

Specification (January 2000), herein after reference C2.

Datasage teaches the public use and sale of a system and method for predicting a behavior of a first customer at a future date comprising (reference B: Column 3, Paragraph 1, Page 18; Column 1, Paragraph 2, Page 20; reference C: Paragraphs 3-6, Page 2):

- accessing data regarding a vendor's customers from one or more databases (reference A: Paragraph 3, Page 3; Last Paragraph, Page 5; Last Paragraph, Page 10; reference C1: revseries, Page 16; POS data, Paragraph 1, Page 22; reference C2: Paragraphs 5, Page 1);

- generating timeseries information for at least one of the vendor's customers (reference A: Last Paragraph, Page 4; reference C1: revseries, Page 16; reference C2: resseries, visitseries, etc.; Pages 5-6);

- training (calibrating, initializing, etc.) a model (equation, function, system, network, etc.) to obtain weights (coefficients, values, etc.) for a variable wherein training is performed using polynomial regression and at least some of the timeseries information (reference A: Last Paragraph, Page 20; reference C1: Paragraphs 1-2, Page 22; "Polynomial regression takes all available variables, and attempts to find a set of weights that transforms the inputs to a value as close as possible as the target values.", Number 1, Page 35; Paragraph 2, Page 39; Figures 19, 24, 27; reference C2: Paragraphs 2-3, Last Paragraph, Page 1; Tables, Page 4);

- predicting (estimating, forecasting, etc.) the behavior (action, characteristic, etc.; e.g. revenue, retention) of the first customer at a future date, wherein predicting is performed using the weights in the model and at a frequency greater than monthly

(reference A: Paragraph 3, Page 3; Bullets 1-8, Page 15; Bullets 1-4, Page 21;

reference C1: revenue prediction, Page 14; Paragraphs 1-2, Page 22; Numbers 3-4,

Pages 32-33; "Best Revenue Forecast Method", "The best model for revenue prediction

(figure 24 top) is "dmm with category drops" under either polynomial regression or

decision tree.", Paragraph 1, Page 37; "Best Retention Method", Paragraph 2, Page 37;

Figures 19, 29; reference C2: Appendix Figures); and

    - providing forecasting results via a graphical user interface (reference C2:

Appendix Figures).

    An issue of public use or on sale activity has been raised in this application. In

order for the examiner to properly consider patentability of the claimed invention under

35 U.S.C. 102(b), additional information regarding this issue is required as follows:

please provide the names of any products or services that have incorporated the

claimed subject matter (e.g. CirrusNet, Datasage, Customer Analyst, netCustomer, etc.)

as well as information regarding their public use and/or sale (e.g. product road maps,

sales presentations, investor disclosures, case studies, product manuals, product

brochures, etc.), and provide a citation and a copy of each publication which any of the

applicants authored or co-authored and which describe the disclosed subject matter

and/or products or services.

    Applicant is reminded that failure to fully reply to this requirement for information

will result in a holding of abandonment.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

7.   Claims 1-7, 9-15 and 17-22 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Cabena et al., Intelligent Miner for Data Applications Guide (1999) in

view of Kitts, Brendan, An Evaluation of Customer Retention and Revenue Forecasting

in the Retail Sector (October 1999, reference C1).

Regarding Claims 1 and 9 Cabena et al. teach a system and method of

predicting a behavior of a a plurality of customers (first/second) at a plurality of future

dates comprising (Section 1.4: Data Mining Applications, Pages 8-9; Section 1.5: Data

Mining Techniques, Pages 9-13; Chapter 3: Case Study Framework, Pages 27-32;

Chapters 4-7, Pages 33-132):

   - accessing data regarding a vendor's customers from one or more databases

("databases", data warehouse, data sources; Paragraph 1, Page 15, Paragraph 1, Page

20; Page 21; Figure 3);

   - generating timeseries information for at least one of the vendor's customers

(Section 4.3.1 Data Selection, Page 36; Section 7.4.5 Timeseries Prediction, Pages

128-129; Figure 12);

- training (initializing, calibrating, correlating, etc.) and testing one or more

models to obtain weights (score, value, coefficients, parameters, etc.) for a variable

wherein training is performed using at least some of the time series information (Section

6.3.3: Data Sampling for Training and Test, Pages 93-95; Section 6.3.5: Train and Test,

Page 95; Pages 10,12, 24, 99, 101; Figures 60, 64; i.e. assigning a weight to each

variable in a predictive model part of the training and testing efforts; Paragraph 4, Page

12; "Field Weighting", Page 47; "adaptive connection", Page 145; "weight", Page 149);

- predicting (estimating, forecasting, etc.) the behavior (action, characteristic,

etc.) of a (first) customer at a future date, wherein predicting is performed using the

weights in the model and at a frequency greater than monthly (Paragraph 1, Page 73);

and

- providing forecasting results to a user in a graphical user interface ("Data

Presentation", "Visualization", "Visualizer"; Bullet 2, Page 5; Section 2.3, Page 19; Page

21; Figures 2-3, 8 and 67).

While Cabena et al. teach that the predictive modeling system and method trains

and tests each of the plurality of well-known and widely used statistical/predictive

models supported by the system/method for the purposes of selecting/generating a

model that most accurately reflects the data being modeled (Pages 5, 9-10) Cabena et

al. does not expressly teach utilizing polynomial regression to obtain (determine) model

weights (parameters, coefficients, etc.) as claimed.

Kitts teaches training a model to obtain weights for a variable wherein training is

performed using polynomial regression and at least some customer timeseries

information (Paragraphs 1-2, Page 22; "Polynomial regression takes all available

variables, and attempts to find a set of weights that transforms the inputs to a value as

close as possible as the target values.", Number 1, Page 35; Paragraph 2, Page 39;

Figures 19, 24, 27), in an analogous art of data mining and/or consumer predictive

modeling, for the purposes of comparing over 200 well known forecasting models ability

to predict customer revenues and/or retention (Paragraph 1, Page 1; E. Page 3; Last

Paragraph, Page 36; Paragraph 1, Page 47; Appendix D, Pages 57-62; Figures 24, 27).

More generally Kitts teaches a system and method for predicting a behavior of a

first/second customer at a future date comprising:

- accessing data regarding a vendor's customers from one or more databases

(revseries, Page 16; POS data, Paragraph 1, Page 22);

- generating timeseries information for at least one of the vendor's customers

(revseries, Page 16);

- training (calibrating, initializing, etc.) a model (equation, function, system,

network, etc.) to obtain weights (coefficients, values, etc.) for a variable wherein training

is performed using polynomial regression and at least some of the timeseries

information (Paragraphs 1-2, Page 22; Number 1, Page 35; Paragraph 2, Page 39;

Figures 19, 24, 27);

- predicting (estimating, forecasting, etc.) the behavior (action, characteristic,

etc.; e.g. revenue, retention) of the first customer at a future date, wherein predicting is

performed using the weights in the model and at a frequency greater than monthly
(revenue prediction, Page 14; Paragraphs 1-2, Page 22; Numbers 3-4, Pages 32-33;
"Best Revenue Forecast Method", "The best model for revenue prediction (figure 24 top)
is "dmm with category drops" under either polynomial regression or decision tree.",
Paragraph 1, Page 37; "Best Retention Method", Paragraph 2, Page 37; Figures 19,
29);

- that the predicted customer behavior includes at least the following: likelihood
of retention, revenue, visits, and the like (Pages 4-5, 14-15, 37; Numbers 3-4, Pages
32-33; Appendix D, Pages 59-62);

- each of the accessing and generating are performed for a variety of timeframes
including but not limited to: periodic daily, weekly, real-time, near real-time, or the like
(Page 12; Numbers 3-4, Pages 32-33); and

- generating a customer's timeseries information as the customer is added
and/or updating the information as changes occur (Figure 9).

It would have been obvious to one skilled in the art at the time of the invention
that the predictive modeling system and method, with its utilization of well known and
widely used statistical/predictive models, as taught by Cabena et al. would have
benefited from in view of the teachings of Kitts; the resultant system/method would
provide users with the "Best Revenue Forecast Method" (i.e. polynomial regression or
decision tree; Kitts: Paragraph 1, Page 37).

Regarding Claims 2, 10 and 21 Cabena et al. teach a system and method for predicting a behavior of a customer wherein users select a forecast horizon (Page 117) and a time window of transactions to analyze/predictively model (periodic basis, monthly, quarterly, daily, etc ; Pages 72-73 and 91; Figure 57).

It is noted that the timeframe in which the accessing and generating steps are performed merely represents non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific timeframe in which the accessing and generating steps are performed. Further, the structural elements remain the same regardless of the specific timeframe in which the accessing and generating steps are performed. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, see In re Gulack, 703 F.2d 1381, 1385, 217 USPQ 401, 404 (Fed. Cir. 1983); In re Lowry, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994); MPEP 2106.

Regarding Claims 3, 11 and 17 Cabena et al. teach a system and method for predicting a behavior of a customer wherein each of the accessing and generating are performed in substantially real-time, real-time and/or near real-time (Paragraphs 2-4, Page 28).

It is noted that the timeframe in which the accessing and generating steps are performed merely represents non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific timeframe in which the accessing and generating steps are performed. Further, the structural elements remain the same regardless of the specific timeframe in which the accessing and generating steps are performed. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, see In re Gulack, 703 F.2d 1381, 1385, 217 USPQ 401, 404 (Fed. Cir. 1983); In re Lowry, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994); MPEP 2106.

Regarding Claims 4 and 12 Cabena et al. teach a system and method for predicting a behavior of a customer wherein the behavior includes the likelihood of retention (Chapter 3.1: Customer Relationship Management, Pages 27-28; Chapter 7: Attrition Model to Improve Customer Retention, Pages 111-132; Figure 4).

Regarding Claims 5 and 13 Cabena et al. teach a system and method for predicting a behavior of a customer wherein the behavior includes future revenue (profitability, sales, purchases, etc.; Pages 34, 36, 37, 39, 64; Table 1, Page 64).

Regarding Claims 6-7 and 14-15 Cabena et al. teach a system and method for predicting a behavior of a customer wherein:

- the accessing is performed for a second customer (Paragraph 1, Page 15,

Paragraph 1, Page 20; Page 21; Figure 3); and

- removing a datum (data point, data, information, outliers, etc.; Page 16;

Section 4.3.2: Data Preparation, Pages 38-44; Section 6.3.2: Data Preparation, Page

92) for the second customer before and/or after training for the customer exceeds an

outlier limit (e.g. remove outliers that disturb/distort the data; performs the data

preparation portion of the process multiple times, before and after training has occurred;

Figure 7, Page 14).

Regarding Claim 18 Cabena et al. teach a system and method for predicting a

behavior of a customer further comprising the treatment of outliers as discussed above.

Cabena et al. does not expressly teach utilizing a skip interval to reduce effects

of dominating customers as claimed.

Official notice is taken that skipping data/information at regular intervals is old

and well-known statistical sampling technique (i.e. a systematic sample is a procedure

that selects every Nth unit, skip interval, of a population until the desired sample size is

reached) that provides a mechanism for systematically sampling a large data set and/or

reduces the size of the data to be analyzed by skipping data at regular intervals (skip

intervals).

It would have been obvious to one skilled in the art at the time of the invention that the system and method for predicting a behavior of a customer at a future date as taught by the combination of Cabena et al. and Kitts would have benefited from utilizing skip intervals to systematically sample the large amounts of customer timeseries data and/or reduces the size of the data to be analyzed/predictively modeled by skipping data at regular intervals.

Regarding Claim 19 Cabena et al. teach a system and method for predicting a behavior of a customer wherein the generating timeseries information further comprises generating a customer's timeseries information as the customer is added (Section 5.3.2 Data Selection, Page 70; Figure 28).

Regarding Claim 20 Cabena et al. teach wherein the generating timeseries information further comprising updating a customer's timeseries information a changes occur (Paragraph 2-3, Page 28; Figure 57).

Regarding Claim 22 Cabena et al. teach wherein the behavior of the first customer includes at least one of the following (selected from the group consisting of) revenue, visits, Pages, viewed, mouse clicks or a combination thereof (Bullets 1-9, Page 39; Table 1; Figure 57).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Stuckman et al., U.S. Patent No. 5,701,395, teach a system and method for training a model to obtain weights (coefficients) wherein the training is performed using polynomial regression.

- Ahlberg, Christopher, U.S. Patent No. 6,405,195, teaches a system and method for analyzing a plurality of data/information including but not limited to timeseries data using a plurality of well known statistical/analytical techniques/approaches including regression analysis and decision trees.

- Lundahl et al., U.S. Patent no. 6,636,862, teach a method for predicting a behavior of one or more users based on the analysis in real-time/near real-time of a plurality of timeseries information/data wherein the system/method trains (calibrates) models to determine model coefficients/weights. Lundahl et al. further teach that the system/method removes non-representative data points (outliers) in order to minimize/limit their effect on the data.

- Keller, Martin, U.S. Patent No. 6,829,621, teaches a system and method for generating a prediction model using "regression functions" wherein the regression functions include but are not limited to polynomial regression models which are trained (i.e. variable coefficients/weights and dimensions are determined) using data from one or more databases.

- Tamayo et al., U.S. Patent No. 6,941,318, teach a method and system for predicting a behavior of a customer using one or more trained "models."

- Makridakis, Spyros et al., Forecasting Methods and Applications (1998) teach a plurality of old and very well known methods and techniques for predicting the future behavior of one or more entities (business, users, customers, consumers, etc.) wherein predictive models are generated and analyzed using a plurality of well known statistical techniques including but not limited to regression (linear, multiple linear, polynomial regression, etc.).

- Elder et al., A Comparison of Leading Data Mining Tools (1998) teach a plurality of well known methods and systems for prediction future behavior of one or more customers and that the systems/methods support a plurality of commonly used predictive modeling approaches/methods including but not limited to decision trees and polynomial regression (networks).

- Ryan et al., Diagnosing customer loyalty drivers (1999) teach two very well known statistical/mathematical approaches/techniques, partial least squares and regression, for predicting a behavior (e.g. retention, loyalty) of one or more customers using a plurality of timeseries data/information.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott L. Jarrett whose telephone number is (571) 272-7033. The examiner can normally be reached on Monday-Friday, 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Hafiz Tariq can be reached on (571) 272-6729. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

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Business Center (EBC) at 866-217-9197 (toll-free).

2/28/2006

TARIQ R. HAFIZ

SUPERVISORY PATENT EXAMINER

TECHNOLOGY